WHAT IS CLAIMED:

1. A process for cleaning large bone grafts, comprising:

selecting a large substantially intact bone;

removing excess cartilage from at least one articulating surface of the bone;

preparing an opening through the cortical layer of the bone to permit access of a vacuum line to the bone cavity;

attaching a vacuum line via the opening for application of vacuum to the bone cavity;

immersing the bone in a solution within a container wherein the solution includes at least one solvent for bone marrow; and

applying a vacuum to the vacuum line to draw the solution through the at least one cartilaginous articulating surface and then through the bone cavity so as to draw the solution and solubilized bone marrow through the vacuum line to exit the bone at the opening.

2. The process according to claim 1, further comprising:

sealing the opening prior to immersing the bone in the solution.

3. The process according to claim 1, further comprising:

sealing the opening after immersing the bone in the solution.

4. The process according to claim 1, further comprising:

discontinuing the application of vacuum when the bone has been substantially cleaned of bone marrow.

5. The process according to claim 1, further comprising:

refilling the container with a second solution for further processing the bone including flushing the first solution from the bone; and

drawing the second solution through the at least one cartilaginous articulating surface and then through the bone cavity and the vacuum line to exit the bone at the opening.

6. The process according to claim 1, further comprising collecting the solution drawn through the bone cavity via the vacuum into a disposable container.

7. The process according to claim 6, further comprising adding at least one strong viral or bacterial inactivator to the disposable container prior to receiving solutions therein.

8. The process according to claim 1, further comprising providing at least one filter in the vacuum line to further prevent potential spread of biohazardous materials.

9. The process according to claim 1, wherein the preparing an opening through the cortical layer comprises drilling a hole through the cortical layer and sealing a tapping port therein; and

the attaching the vacuum line via the opening for application of vacuum to the bone cavity comprises securely attaching one end of the vacuum line to the tapping port so as to seal the vacuum line with the cortical bone opening.

10. The process according to claim 1, wherein the preparing an opening through the cortical layer comprises cutting the bone transversely between proximal and distal ends;

the process further comprising placing and sealing a sealing cap over the cut end of the bone; and

the attaching the vacuum line via the opening for application of vacuum to the bone cavity comprises securely attaching one end of the vacuum line to the sealing cap.

11. The process according to claim 10, further comprising:

initial removal of bone marrow from the cut end of the luminal space of the bone, using pulsatile lavage, prior to the steps of sealing the opening and attaching the vacuum line.

12. The process according to claim 10, further comprising:

initial removal of bone marrow from the cut end of the luminal space of the bone, using mechanical means, prior to the steps of sealing the opening and attaching the vacuum line.

13. The process according to claim 9, wherein the container of solution comprises a deformable container and, after submersing the bone in the deformable container of solution, the process further comprising tightly sealing the deformable container around the vacuum line or point of attachment of the vacuum line to the bone.

14. The process according to claim 1, further comprising adjusting the level of the applied vacuum to maintain solvent flow through the bone of from about 8 ml/min to 32 ml/min.

15. The process according to claim 14, wherein the level of the applied vacuum is adjusted to maintain solvent flow through the bone of from about 15 ml/min to 25 ml/min.

16. The process according to claim 1, wherein the solution comprises endotoxin-free deionized/distilled water and at least one solvent selected from the group consisting of anionic detergents and non-anionic detergents.

17. The process according to claim 16, wherein the solution further comprises ethanol.

18. The process according to claim 16, wherein the solution comprises at least one solvent selected from the group consisting of polyoxyethylene alcohols, polyethylene glycol p-isooctylphenylethers, polyoxyethylene nonylphenol, and polyoxyethylene sorbitol esters.

19. The process according to claim 1, wherein the solution comprises about 0.0001X to 10X of a 1X detergent solution containing about 0.066 weight percent Brij-35, about 0.02 weight percent Nonidet P-40, and about 0.02 weight percent Nonoxynol-9 in endotoxin free water.

20. The process according to claim 19, wherein the solution comprises about 0.001X to 0.1X of the 1X detergent solution.

21. The process according to claim 20, wherein the solution comprises about 0.001X to 0.01X of the 1X detergent solution.

22. The process according to claim 21, wherein the solution comprises about 0.005X to 0.01X of the 1X detergent solution.

23. The process according to claim 1, wherein the solution comprises about 5 to 95% ethanol, measured by a volume-to-volume ratio.

24. The process according to claim 23, wherein the solution comprises about 10 to 30% ethanol, measured by a volume-to-volume ratio.

25. The process according to claim 1, wherein the solution comprises endotoxin-free deionized/distilled water and at least one detergent selected from the group consisting of anionic detergents and nonanionic detergents, in concentrations ranging from about 0.001 to 2 weight percent.

26. The process according to claim 25, wherein the solution further comprises ethanol.

27. The process according to claim 25, wherein the solution comprises at least one solvent selected from the group consisting of polyoxyethylene alcohols, polyethylene glycol p-isooctylphenylethers, polyoxyethylene nonylphenol, and polyoxyethylene sorbitol esters.

28. The process according to claim 25, wherein the detergent concentration ranges from about 0.01 to 0.5 weight percent.

29. The process according to claim 1, wherein the solution is controlled within a temperature range of about 20°C to 65°C and maintained within the temperature range during processing.

30. The process according to claim 29, wherein the temperature range is controlled and maintained at about 27°C to 55°C.

31. The process according to claim 30, wherein the temperature range is controlled and maintained at about 40°C to 48°C.

32. The process according to claim 13, further comprising:

immersing the deformable container of solution which contains the bone into a temperature controlled water bath.

33. The process according to claim 1, further comprising:

monitoring the solution exiting the bone cavity to determine when essentially all of the bone marrow has been removed from the bone.

34. The process according to claim 33, wherein the monitoring comprises measuring absorbance in the range of about 410 nm to 700 nm.

35. The process according to claim 34, wherein the monitoring comprises measuring absorbance at substantially 410 nm.

36. The process according to claim 33, wherein the monitoring comprises a visual monitoring of the color of the solution exiting the bone.

37. The process according to claim 5, wherein the second solution comprises a washing solution for flushing the first solution from the bone and for further reducing bacterial, fungal or viral contaminants.

38. The process according to claim 37, wherein the washing solution comprises at least one component selected from the group consisting of endotoxin-free deionized/distilled water and ethanol.

39. The process according to claim 38, wherein the washing solution further comprises at least one component selected from the group consisting of antibiotics, antiviral agents, hydrogen peroxide, permeation enhancers, organic acids and dilute solutions of strong acids.

40. The process according to claim 16, wherein the solution further comprises at least one component selected from the group consisting of antibiotics, antiviral agents, hydrogen peroxide, permeation enhancers, organic acids and dilute solutions of strong acids.

41. The process according to claim 1, wherein:

the solution comprises a first solution comprising about 0.01X of a 1X detergent solution containing about 0.066 weight percent Brij-35, about 0.02 weight percent Nonidet P-40, and about 0.02 weight percent Nonoxynol-9 in endotoxin free water;

refilling the container with a second solution for further processing the bone including flushing the first solution from the bone; and

drawing the second solution through the at least one cartilaginous articulating surface and then through the bone cavity and the vacuum line to exit the bone at the opening so that a maximum concentration of solution in the bone is equivalent to 0.001X detergent solution.

42. A bone graft produced by the process recited in claim 1.

line.

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43. A bone graft produced by the process recited in claim 41.

44. A process for cleaning large bone grafts, comprising:

selecting a large, substantially intact bone;

removing excess cartilage from at least one articulating surface of the bone;

preparing an opening through the cortical layer of the bone by cutting the bone transversely between proximal and distal ends to permit access of a vacuum line to the bone cavity;

immersing the bone in a deformable container of solution which contains at least one solvent for bone marrow;

deforming ends of the deformable container around the cortical surface near the cut end of the bone;

sealing the opening by placing and sealing a sealing cap over the cut end of the bone and the ends of the deformable container;

attaching a vacuum line via the opening for application of vacuum to the bone cavity by securely attaching one end of the vacuum line to the sealing cap;

applying a vacuum through the vacuum line to draw the solution through the at least one cartilaginous articulating surface and then through the bone cavity so as to draw the solution and solubilized bone marrow through the vacuum line to exit the bone at the opening; and

discontinuing the application of vacuum when the bone has been substantially cleaned of bone marrow.

45. The process according to claim 44, further comprising:

refilling the deformable container with a second solution for further processing the bone including flushing the first solution from the bone; and

drawing the second solution through the at least one cartilaginous articulating surface and then through the bone cavity and the vacuum line to exit the bone at the opening.

46. The process according to claim 44, further comprising collecting the solution drawn through the bone cavity via the vacuum into a disposable container.

47. The process according to claim 46, further comprising adding at least one strong viral or bacterial inactivator to the disposable container prior to receiving solutions therein.

48. The process according to claim 44, further comprising providing at least one filter in the vacuum line to further prevent the potential spread of biohazardous materials.

49. The process according to claim 44, further comprising:

initial removal of bone marrow from the cut end of the luminal space of the bone, using pulsatile lavage, prior to the steps of sealing the opening and attaching the vacuum line.

50. The process according to claim 44, further comprising:

initial removal of bone marrow from the cut end of the luminal space of the bone, using mechanical means, prior to the steps of sealing the opening and attaching the vacuum line.

51. The process according to claim 44, further comprising:

immersing the deformable container of solution which contains the bone, into a temperature controlled water bath, after attachment of the vacuum line.

52. The process according to claim 44, wherein the solution comprises about 0.0001X to 10X of a 1X detergent solution containing about 0.066 weight percent Brij-35, about 0.02 weight percent Nonidet P-40, and about 0.02 weight percent Nonoxynol-9 in endotoxin free water.

53. The process according to claim 52, wherein the solution comprises about 0.001X to 0.1X of the 1X detergent solution.

54. The process according to claim 53, wherein the solution comprises about 0.001X to 0.01X of the 1X detergent solution.

55. The process according to claim 54, wherein the solution comprises about 0.005X to 0.01X of the 1X detergent solution.

56. The process according to claim 44, wherein:

the solution comprises a first solution comprising about 0.01X of a 1X detergent solution containing about 0.066 weight percent Brij-35, about 0.02 weight percent Nonidet P-40, and about 0.02 weight percent Nonoxynol-9 in endotoxin free water;

refilling the container with a second solution for further processing the bone including flushing the first solution from the bone; and

drawing the second solution through the at least one cartilaginous articulating surface and then through the bone cavity and the vacuum line to exit the bone at the opening so that a maximum concentration of solution in the bone is equivalent to 0.001X detergent solution.

57. A bone graft produced by the process recited in claim 44.

58. A bone graft produced by the process recited in claim 56.

59. A process for cleaning large bone grafts, comprising:

selecting a large substantially intact bone; and

applying a vacuum to draw solution comprising at least one solvent for bone marrow through the large substantially intact bone to solubilize bone marrow.

~~60.~~ 2 The process according to claim ~~59~~ 1, wherein the solution comprises about 0.0001X to 10X of a 1X detergent solution containing about 0.066 weight percent Brij-35, about 0.02 weight percent Nonidet P-40, and about 0.02 weight percent Nonoxynol-9 in endotoxin free water.

3 ~~61~~. The process according to claim ~~60~~ 2, wherein the solution comprises about 0.001X to 0.1X of the 1X detergent solution.

4 ~~62~~. The process according to claim ~~61~~ 3, wherein the solution comprises about 0.001X to 0.01X of the 1X detergent solution.

5 ~~63~~. The process according to claim ~~62~~ 4, wherein the solution comprises about 0.005X to 0.01X of the 1X detergent solution.

6 ~~64~~. The process according to claim ~~59~~ 1, wherein the solution comprises endotoxin-free deionized/distilled water and at least one detergent selected from the group consisting of anionic detergents and nonanionic detergents, in concentrations ranging from about 0.001 to 2 weight percent.

7 ~~65~~. The process according to claim ~~64~~ 6, wherein the solution further comprises ethanol.

Sub B2 66. A bone graft produced by the process recited in claim 59.

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